Sleep and Academic Performance

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Research Topic

- The predictive relationship of sleep and academic performance (GPA).
Vocabulary

- **Traditional** - variables that have commonly been shown to predict academic performance in previous research
  - High school GPA, standardized test scores, ethnicity, gender, socioeconomic status

- **Modifiable** - variables that may be amenable to treatment to increase academic performance
  - Alcohol/drug use, alcohol/drug disorder, anxiety, depression, sleep
Purpose

The intention of this project was to compare traditional and modifiable variables, specifically sleep, as predictors of GPA (cumulative & semester*).

* Data not shown in this presentation
Research Questions

- Is sleep significantly correlated with GPA?
  - If yes, in what way?
- Is sleep a significant predictor of GPA when other variables are accounted for?
Literature Review

• Several studies have shown a positive correlation between undergraduate academic performance (GPA) and postgraduate earnings (Filer 1981, 1983; Jones & Jackson, 1990; Pascarella & Terenzini, 2003; Wise, 1975).

• Colleges and universities rely very heavily on standardized test scores and high school grades to predict GPA.
Literature Review

- When combined, HS GPA and standardized test scores only predict 25% of GPA variance (ACT, 1997; Boldt, 1986; Mathiasen, 1984; Mouw & Khanna).

- In previous studies, gender, ethnicity, and socioeconomic status (SES) have predicted GPA (Betts & Morell, 1999; Peters, Joireman, & Ridgway, 2005).
Literature Review

- Research has shown mixed results (negative relationship or no relationship) for alcohol use as a predictor of GPA (Paschall & Freisthler, 2003; Singleton, 2007).

- Chronic drug use leads to cognitive impairments on achievement tests (Block, Erwin, & Ghoneim, 2002; Hoshi, Mullins, Boundy, Brignell, Piccini, & Curran, 2007; Solowij et al., 2002).
Literature Review

- Previous and current research has shown a positive relationship between anxiety disorders and GPA (Stringer, Crown, Lucas, & Supramanium, 1977).

- Research has yet to show whether a relationship exists between depression and GPA (Hysenbegasi, 2005; Svanum & Zody, 2001).
Literature Review

- Research of sleep patterns and academic performance has been very limited.
  - Most researchers use total sleep time to study differences in sleep patterns (Gau et al., 2007; Peters et al., 2005; Thacher, 2008).
  - There are many other sleep variables that can be studied:
    - Time in bed, sleep efficiency, sleep onset latency, wake after sleep onset, time awake in morning, nap time, and number of awakenings
Sleep problems are a frequent occurrence within the college population (Forquer, Camden, Gabriau, & Johnson, 2008). These problems should affect more than the bedroom.
Hypotheses

- Sleep pattern will be significantly correlated with GPA because it is a primary part of students’ lifestyles.
  - Specifically, sleep onset latency, wake time after sleep onset, and time awake in morning will predict GPA.
- Sleep pattern will significantly predict GPA when all variables are accounted for.
- Sleep pattern will significantly predict GPA when traditional variables are removed.
Methods

- Participants (N = 951) were recruited from undergraduate psychology classes at the University of North Texas.
- Participants completed a self-report health questionnaire packet and a week long sleep diary, available on the SONA system, an online research service.
- Students received four extra credit points towards their psychology class.
Methods

- Demographics
  - 74% were females
  - Ethnicity
    - 63% Caucasian
    - 13% African-American
    - 10% Hispanic-American
    - 5% Asian/Pacific-Islander
    - 1% Native American
    - 4% other
  
- Academic rank
  - 40% freshmen
  - 27% sophomores
  - 19% juniors
  - 15% seniors
  
- Age ($M = 20.3; SD = 3.9$).

- Family income ($Mean = $100,000 - $149,000; SD = 2.9$).
Data Analysis

- Multiple correlation
  - Sleep pattern variables and GPA
  - All other variables and GPA*
- Stepwise multiple regression
  - Significant correlates and GPA**
  - Significant modifiable variables and GPA

*Data not shown in this presentation
**Only sleep pattern variables shown
Results

- Multiple correlation of sleep pattern and GPA
  - Significant relationship between GPA and:
    - Sleep onset latency ($r = -0.06, p < 0.05$)
    - Nap time ($r = -0.11, p < 0.01$)
    - Number of awakenings ($r = 0.08, p < 0.05$)
### Table 1

Summary of Stepwise Multiple Regression Analysis with Significant Correlates as Criterion

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<th>Step</th>
<th>Predictor Variable</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
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<th>$\beta$</th>
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**Note.** NWAK = Number of Wakenings; NAP = Nap Time; PSS = Perceived stress scale

*p < .05.  **p < .01.*
### Table 2

Summary of Stepwise Multiple Regression Analysis with Significant Intervention - Possible Correlates as Criterion

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</tbody>
</table>

**Note.** AUDIT = Alcohol use disorders identification test; NAP = Nap Time; PSS = Perceived stress scale; NWAK = Number of Wakenings; MPS = Marijuana problem scale. *$p < .05$. **$p < .01$.**
Discussion

- Sleep pattern was significantly correlated with GPA.
  - Specifically, sleep onset latency, nap time, and number of awakenings.
- Nap time and number of awakenings continued to be significant predictors of GPA after accounting for all other variables.
  - Each accounted for an additional 1% of GPA variance.
Discussion

- Overall, of modifiable variables:
  - Sleep variables accounted for 2% of GPA variance
  - Alcohol use disorders 2%
  - Trait stress 1%
  - Marijuana use 1%
Acknowledgements

- Dr. Daniel Taylor, Psychology
- Dr. Susan Eve, Associate Dean of the Honors College
- Dr. Gloria Cox, Dean of the Honors College
- Department of Psychology
- College of Arts and Science
References

References